

Check List – Preparing a Quality Assurance Project Plan (QAPP)

The material in this document is a checklist for preparing a QAPP for all types of water quality monitoring projects. The content on the following pages is excerpted from Chapter 3: Some Basin QA/QC Concepts of *The Volunteer Monitor's Guide to Quality Assurance Project Plans*.

Part A – Project Management (Elements 1 - 9)

- 1) **Title and Approval Page** - Names, titles, signatures, and document signature dates of all appropriate approving officials which may include; project manager, project QA officer, the DCR Grant Manager, and the EPA project manager and QA officer.
- 2) **Table of Contents** - A Table of Contents should include section headings with appropriate page numbers and a list of figures and tables, appendices and attachments.
- 3) **Distribution List** - List the individuals and organizations that will receive a copy of your approved QAPP and any subsequent revisions. Include representatives of all groups involved in your monitoring effort. Include their contact information
- 4) **Project / Task Organization** - Identify all key personnel and organizations that are involved in your program, including data users, and list their specific roles and responsibilities. In many monitoring projects, one individual may have several responsibilities. An organizational chart is a good way to graphically display roles.
- 5) **Problem Identification / Background** - In a narrative, briefly state the problem your monitoring project is designed to address. Include any background information such as previous studies that indicate why this project is needed. Identify the intended use of your data, by whom and how.
- 6) **Project / Task Description** - In general, describe the work to be performed and where it will take place. Identify what kinds of samples will be taken, what kinds of conditions they will measure, which are critical, and which are of secondary importance. Indicate how you will evaluate your results (how you will be making sense out of what you find). For example, you may be comparing your water quality readings to State or EPA standards, or comparing your macro invertebrate evaluations to State-established reference conditions or historical information. Include an overall project timetable that outlines beginning and ending dates for the entire project as well as for specific activities within the project. Include information about sampling frequency, lab schedules, and reporting cycles.

- 7) **Data Quality Objectives for Measurement Data** - Data Quality Objectives (DQOs) are the quantitative and qualitative terms you use to describe how good your data need to be to meet your project's objectives. DQOs for measurement data (referred to here as data quality indicators) are precision, accuracy, representativeness, completeness, comparability, and measurement range. Provide information on these indicators, in quantitative terms if possible.
- a. *Precision: is the degree of agreement among repeated measurements of the same characteristic, or parameter, and gives information about the consistency of your methods.*
 - b. *Accuracy: is a measure of confidence that describes how close a measurement is to its "true" value.*
 - c. *Measurement Range: is the range of reliable readings of an instrument or measuring device, as specified by the manufacturer.*
 - d. *Representativeness: is the extent to which measurements actually represent the true environmental condition.*
 - e. *Comparability: is the degree to which data can be compared directly to similar studies. Using standardized sampling, analytical methods, and units of reporting helps to ensure comparability.*
 - f. *Completeness: is the comparison between the amounts of data you planned to collect versus how much usable data you collected, expressed as a percentage.*
- 8) **Training Requirements / Certification** - Identify any specialized training or certification requirements needed to successfully complete any tasks. Discuss how you will provide such training, who will be conducting the training, and how you will evaluate performance.
- 9) **Documentation and Records** - Identify the field and laboratory information and records you need for this project. These records may include raw data, QC Checks, field data sheets, laboratory forms, and voucher collections. Include information on how long, and where, records will be maintained. Copies of all forms to be used in the project should be attached to the QAPP.

Part B - Measurement / Data Acquisition (Elements 10 – 19)

- 10) **Sampling Process Design** - Outline the experimental design of the project including information on types of samples required, sampling frequency, sampling period (e.g., season), and how you will select sample sites and identify them over time. Indicate whether any constraints such as weather, seasonal variations, and stream flow or site access might affect scheduled activities, and how you will handle those constraints. Include site safety plans. Cite the sections of your program's SOPs (Standard Operating Procedures), which detail the sampling design of the project, in place of extensive discussion.

- 11) **Sampling Methods Requirements** - Describe your sampling methods. Include information on parameters to be sampled, how samples will be taken, equipment and containers used, sample preservation methods used, and holding times (time between taking samples and analyzing them). If samples are composites (i.e., mixed), describe how this will be done. Describe procedures for decontamination and equipment cleaning. Most of this information can be presented in a table or you may also cite any SOPs that contain this information.
- 12) **Sample Handling and Custody Requirements** - Sample handling procedures apply to projects that bring samples from the field to the lab for analysis, identification, or storage. These samples should be properly labeled in the field. At a minimum, the sample identification label should include sample location, sample number, date and time of collection, sample type, sampler's name, and method used to preserve sample. Describe the procedures used to keep track of samples that will be delivered or shipped to a laboratory or analysis. Include any chain-of-custody forms and written procedures field crews and lab personnel should follow when collecting, transferring, storing, analyzing, and disposing of samples.
- 13) **Analytical Methods Requirements** - List the analytical methods and equipment needed for the analysis of each parameter, either in the field or the lab. If your program uses standard methods, cite these. If your program's methods differ from the standard or are not readily available in a standard reference, describe the analytical methods or cite and attach the program's SOPs.
- 14) **Quality Control Requirements** - List the number and types of field and laboratory quality control samples that will be taken. This information can be presented in a table. If you use an outside laboratory, cite or attach the lab's QA/QC plan. QC checks for biological monitoring programs can be described by narrative, and, if appropriate, should include discussion of replicate sample collection, cross checks by different field crews, periodic sorting checks of lab samples, and maintenance of voucher and reference collections. Describe what actions you will take if the QC samples reveal a sampling or analytical problem.
- 15) **Instrument / Equipment Testing, Inspection, and Maintenance Requirements** - Describe your plan for routine inspection and preventive maintenance of field and lab equipment and facilities. Identify what equipment will be routinely inspected, and what spare parts and replacement equipment will be on hand to keep field and lab operations running smoothly. Include an equipment maintenance schedule, if appropriate.

- 16) Instrument Calibration and Frequency** - Identify how you will calibrate sampling and analytical instruments. Include information on how frequently instruments will be calibrated, and the types of standards or certified equipment that will be used to calibrate sampling instruments. Indicate how you will maintain calibration records and ensure that records can be traced to each instrument. For biological monitoring programs, the procedures for instrument calibration should include routine procedures that ensure that equipment is clean and in working order.
- 17) Inspection / Acceptance Requirements for Supplies** - Describe how you determine if supplies such as sample bottles, nets, and reagents are adequate for your program's needs.
- 18) Data Acquisition Requirements** - Identify any types of data your project uses that are not obtained through your monitoring activities. Examples include historical information, information from topographical maps or aerial photos, or reports from other monitoring groups. Discuss any limits on the use of this data resulting from uncertainty about its quality.
- 19) Data Management** - Trace the path of data management, from field collection and lab analysis to data storage and use. Discuss how you check for accuracy and completeness of field and lab forms, and how you minimize and correct errors in calculations, data entry to forms and databases, and report writing. Provide examples of forms and checklists. Identify the computer hardware and software you use to manage your data.

Part C - Assessment and Oversight (elements 20-21)

- 20) Assessments and Response Actions** - Discuss how you evaluate field, lab, and data management activities, organizations (such as contract labs) and individuals in the course of your project. These can include evaluations of volunteer performance; audits of systems such as equipment and analytical procedures; and audits of data quality. Include information on how your project will correct any problems identified through these assessments. Corrective actions might include calibrating equipment more frequently; increasing the number of regularly scheduled training sessions, or rescheduling field or lab activities.
- 21) Reports** - Identify the frequency, content, and distribution of reports to data users, sponsors, and partnership organizations that detail project status, results of internal assessments and audits, and how QA problems have been resolved.

Part D - Data Validation and Usability (elements 22-24)

- 22) **Data Review, Validation and Verification Requirements** - State how you review data and make decisions regarding accepting, rejecting, or qualifying the data. All that is needed here is a brief statement of what will be done, by whom.
- 23) **Validation and Verification Methods** - Describe the procedures you use to validate and verify data. This can include, for example, comparing computer entries to field data sheets; looking for data gaps; analyzing quality control data such as chain of custody information, spikes, and equipment calibrations; checking calculations; examining raw data for outliers or nonsensical readings; and reviewing graphs, tables and charts. Include a description of how errors, if detected, will be corrected, and how results will be conveyed to data users.
- 24) **Reconciliation with Data Quality Objectives** - Once the data results are compiled, describe the process for determining whether the data meet project objectives.

Other References and Resources

1. The Volunteer Monitors Guide to Quality Assurance Project Plans.
<http://www.epa.gov/volunteer/qappcovr.htm>
2. EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5, March 2001).
<http://www.epa.gov/quality/qs-docs/r5-final.pdf>
3. Department of Environmental Quality's Quality Assurance Quality Control program
<http://www.deq.virginia.gov/watermonitoring/qaqc.html>
<http://www.deq.virginia.gov/watermonitoring/pdf/wqmpqapp.pdf>
4. Virginia Citizen Water Quality Monitoring Program Methods Manual
<http://www.deq.virginia.gov/cmonitor/pdf/cmonman.pdf>